



POSTER PRESENTATION

Open Access

Deficiency of regulatory B cells in a house dust mite model of asthma

Faouzi Braza^{1,2,3*}, Julie Chesné^{1,3}, G Mahay³, MA Cheminant³, D Lair³, K Botturi-Cavaillès¹, Antoine Magnan³, Sophie Brouard²

From 7th European Workshop on Immune-Mediated Inflammatory Diseases Noordwijk aan Zee, the Netherlands. 28-30 November 2012

Introduction

Asthma is a chronic disorder leading to bronchial obstruction in response to inhaled allergen. It is associated with immune deregulation with specific expansion of Th₂ and Th₁₇ CD4⁺ T cells. Both T cell populations support B cells response by stimulating their proliferation, survival and IgE secretion. B cells are described for their effector functions but recently reports have described their regulatory role in autoimmune and inflammatory disorders. However, definitive identification has been challenging because regulatory B cells (Breg) are rare, do not have a specific marker, and express detectable IL-10 or TGF- β only upon *ex vivo* stimulation. In OVA asthma models, local inhalation tolerance [1], [2] and infections with helminthes [3], [4] induce the generation of regulatory B cells. But no physiological role of this population in the development of asthma has been described yet.

Methods

Mice were sensitized on days 0, 7, 14 and 21 by percutaneous administration of HDM onto the ears. Intra-nasal challenges were performed on day 27 and 34 with 250 μ g HDM. One day after each challenge, we realized by flow cytometry a complete B cell phenotyping in spleen and lungs.

Splenocytes and lung cells were isolated and stimulated *ex vivo* with LPS and PMA, ionomycin to induce IL-10 secretion by B cells.

Results

No differential frequency was observed for all B cell populations in the spleen of HDM allergic mice, suggesting a normal B cell development. In contrast, HDM allergic

mice exhibit a strong infiltration of CD19⁺ B cells in lungs and broncho-alveolar lavage after the second challenge. We found an increase of CD19 IgD^{hi} IgM^{low} B2 mature and CD19 IgD- IgM- switched memory B cells in the lung of HDM allergic compared to control mice. We looked at CD19⁺ IL-10⁺ CD1d^{hi} CD5⁺ CD21⁺ CD24^{hi} IgM^{hi} B cell population that has been shown to display regulatory properties in other situations. Whereas this population is present in spleen and lungs of HDM allergic mice, it produces less IL-10 than control after the first and the second challenge both in lung (vs control, $p < 0.01$) and spleen (vs control, $p < 0.05$).

Conclusions

Our results strongly suggest a potential defect of regulatory B cells in the course of asthma. Future investigations will focus on their capacities to inhibit bronchial hyperreactivity and inflammatory responses.

Author details

¹Université de Nantes, France. ²UMR_S1084, Institut de transplantation d'urologie et néphrologie, Nantes, France. ³UMR_S 1087, Institut du Thorax, Nantes, France.

Published: 28 November 2012

References

1. Singh A, Carson WF, Secor ER, Guernsey LA, Flavell RA, Clark RB, Thrall RS, Schramm CM: **Regulatory role of B cells in a murine model of allergic airway disease.** *J. Immunol* 2008, **180**(no. 11):7318-7326.
2. Natarajan P, Singh A, McNamara JT, Secor ER, Guernsey LA, Thrall RS, Schramm CM: **Regulatory B cells from hilar lymph nodes of tolerant mice in a murine model of allergic airway disease are CD5(+), express TGF- β , and co-localize with CD4(+)/Foxp3(+) T cells.** *T cells* 2012, 1-11.
3. A S, S SP, K M, M NE, A A, F PG: **Regulatory B cells prevent and reverse allergic airway inflammation via FoxP3-positive T regulatory cells in a murine model.** *Journal of Allergy and Clinical Immunology* 2010, **125**(no. 5):1114-1124.e8.
4. van der Vlugt LEPM, Labuda LA, Ozir-Fazalikhhan A, Lievers E, Gloude-mans AK, Liu K-Y, Barr TA, Sparwasser T, Boon L, Ngoa UA,

¹Université de Nantes, France

Full list of author information is available at the end of the article

Feugap EN, Adegnikaa AA, Kreamsner PG, Gray D, Yazdanbakhsh M, Smits HH:
Schistosomes induce regulatory features in human and mouse CD1d(hi)
B cells: inhibition of allergic inflammation by IL-10 and regulatory
T cells. *PLoS ONE* 2012, no. 7(2):e30883.

doi:10.1186/1479-5876-10-S3-P25

Cite this article as: Braza *et al.*: Deficiency of regulatory B cells in a house dust mite model of asthma. *Journal of Translational Medicine* 2012 10(Suppl 3):P25.

**Submit your next manuscript to BioMed Central
and take full advantage of:**

- Convenient online submission
- Thorough peer review
- No space constraints or color figure charges
- Immediate publication on acceptance
- Inclusion in PubMed, CAS, Scopus and Google Scholar
- Research which is freely available for redistribution

Submit your manuscript at
www.biomedcentral.com/submit

